REMARKS

Applicants respectfully request reconsideration of the above-captioned application. Claims 1-7, 9-16 and 18-20 are currently pending. Applicants gratefully acknowledge the withdrawal of finality and the indications that claims 9, 11, 18 and 20 contain allowable subject matter. Claims 9, 18 and 20 are in independent form and are therefore allowable. Claim 11 has not been placed in independent form at this time.

The Office Action of March 25, 2004, repeats the rejection of claims 1 and 2 under 35 U.S.C. §102(e) as allegedly being anticipated by the Bajaj et al patent (U.S. Patent No. 6,438,266); and a rejection of claims 3-7, 10, 12-16 and 19 under 35 U.S.C. § 103 as allegedly being unpatentable over the Bajaj et al patent. These rejections continue to be respectfully traversed.

In reviewing the relatively extensive prosecution history, it occurs to the undersigned that part of the difference in opinion as to the patentability of the claims lies in the fact that terms like "layer," "partition" and "progressive" are used by both the applied art and the present invention, but to mean different things. As illustrated in Figure 2 of the present application in an exemplary embodiment, a mesh object (MO) is divided into independent mesh object layers (MOLs), and MOLs are divided into mesh components (MCOM), which in turn are composed of connectivity, geometry and photometry for example. A basic point is that layers are independent from each other. This is in marked contrast to the Bajaj et al patent, wherein the given mesh is converted into a typical triangle strip structure by a layered decomposition such as shown in Figure 3 of the Bajaj et al patent. Then, vertices are defined as layers by grouping the vertices on the contour as shown in Figure 6 of the Bajaj et al patent. The layers are of a parent-child relationship. The layers are not separated from each other and are not independent from each other.

Similarly, in the embodiments disclosed in the present application, the 3-D mesh is divided into a plurality of components and each component can be

encoded. That is, each 3-D mesh comprises components (e.g., geometry, connectivity and photometry information) and each component can be processed independently. Therefore, each component is combined to form a complete 3-D mesh after independent processing. In marked contrast, in the Bajaj et al patent, *connectivity* progressive coding is described at columns 9-13 and the abstract. What is meant by the Bajaj et al connectivity progressive coding is that the number of vertices is divided into two groups. One group is transmitted over an intra-layer and the other group is transmitted as an inter-layer. Unlike the present invention, the connectivity progressive coding of the Bajaj et al patent is for enhancing the resolution by dividing the number of vertices, transmitting/restoring the first half as intra information and adding the latter half, with respect to progressive coding. Further, as described at columns 10 and 11 of the Bajaj et al patent, geometry information is represented at a course level by transmitting the MSB (Most Significant Bits) and at a detail level by transmitting the lower bits.

Finally, it is noted that photometry is not mentioned in the Bajaj et al patent.

Applicants also wish to emphasize that Figure 10 of the Bajaj et al patent discloses an overall system. However, it does not disclose the concept of "progressive" 3-D mesh information coding as understood from the present application. It describes how to encode vertices and triangles in a layer. Figures 29 and 30 describe the concept of progressive as meant in the Bajaj et al patent.[1] As can be seen from the flow charts, the vertices are divided into even-number vertex and odd number vertex, transmitted respectively and thus are composed of two layers. This is a progressive concept in the arena of resolution, unlike the present invention.

[1] Confusion with respect to "progressive" coding is easily understood. In its most generic meaning, "progressive" means an image, for example, can be partially displayed before the entire data file is received and decoded, for example. Patentability in this case is at a more detailed level, e.g., the prior art renders a course image followed by a more detailed image as to geometry. The present invention will allow a single mesh component to be decoded and displayed, for example.

Further, the two separate layers in Figures 31 and 32 describe utilizing a mirror effect or symmetry of the images, and thus these figures have little to do with the present disclosure insofar as this concept is not addressed in the present claims.

Additionally, among the various differences between the present invention and the Bajaj patent is that the Bajaj patent is a multi-resolution coding scheme as described at column 3, for instance, of the Bajaj patent. It occurs to the applicants that the Examiner's reading of column 4 of phrases like "all vertices are grouped in separate layers" may create the impression that the Bajaj et al patent is disclosing something similar to the present invention. However, it is respectfully noted that the Bajaj et al patent generates contours using layered decomposition and grouping the vertices in contour, unlike the present invention.

It is believed that claim 1 distinguishes itself from the Bajaj et al patent in reciting, *inter alia*, "coding each of the plurality of mesh components, wherein the plurality of mesh components are capable of being independently decoded and incrementally reproduced as unit mesh parts of the 3-D mesh." It should be clear that the parent-child relationship of the layers in the Bajaj patent does not meet these recitations. It is further noted that applicants have added the word "independently" to further emphasize the effect of the term "incrementally reproduced" already appearing in claim 1 in case this facilitates an easier understanding of the distinctions between the present claims and the applied art.

With respect to claim 2, it is noted that the mesh components are recited as including connectivity information, geometry information and photometry information to reconstruct the coded mesh components themselves. (The phrase "which are necessary" has been deleted as confusing insofar as it is modifying what types of information was necessary or the information itself.) The Bajaj et al. patent does not meet these recitations, and in fact does not mention photometry information at all.

Claims 3 and 4 are dependent from claim 1 and are patentable for the same reasons. It is also believed that the recited steps of extracting one or more mesh object layers from a 3-D mesh and dividing the one or more mesh object layers each into a plurality of mesh components is not squarely met, at least in the context of claim 3, with the Bajaj et al patent. Also, claim 4 goes to the structure of data found, for example, in Figure 11C, where redundant data is reused in the process for coding a mesh component which has not yet been coded.

Claim 5 is independent and recites dividing the transmitted bitstream into a plurality of coded mesh components, wherein the plurality of mesh components are capable of being incrementally reproduced as a unit mesh part of a 3-D mesh. These features, among other things, are not taught or suggested by the Bajaj et al patent for the reasons explained above.

Claim 6 is also independently patentable insofar as it recites the steps of classifying transmitted bitstream into one or more decoded mesh object layers and dividing each of the one or more decoded mesh object layers into a plurality of mesh components.

Claim 7 is independently patentable insofar as information generated while a mesh component is decoded is reused in the process of decoding a mesh component which has not yet been decoded. These features of claim 7, at least when taken in context of claim 5, are not seen in or suggested by the applied art.

Claim 10, which is also independent, is equally patentable for at least its recitation of independent coding and transmitting a plurality of mesh components for each of the one or more mesh object layers, wherein each of the plurality of coded mesh components includes information necessary such that, when decoded, it is capable of being reproduced as a mesh unit part of a 3-D mesh for reciting obtaining a plurality of independent mesh components by decoding the plurality of independent coded and transmitted mesh components.

Independent claim 12 is equally patentable insofar as it recites a progressive 3-D mesh information coding apparatus that includes structure including, *inter alia*, a plurality of component coders for coding a plurality of mesh components. This feature of incremental reproduction as to unit mesh components is thereby brought out in claim 12, particularly in its recitation of a plurality of coded mesh components that are capable of being decoded and incrementally reproduced as mesh unit parts of a 3-D mesh.

Claim 13 is equally patentable for reciting, among other things, a plurality of mesh component analyzers for again dividing each one of the one or more mesh object layers into a plurality of mesh components, thus defining a hierarchy not seen in the applied art, at least in the context of claim 13, when read in light of claim 12. Claim 14 introduces the concept of using coding information generated in a component coder which has already performed coding.

Claim 15, like claim 12, brings out the concept of incremental reproduction in its recitation of "a plurality of component decoders for decoding a plurality of coded mesh components, wherein the plurality of decoded mesh components are capable of being incrementally reproduced as unit mesh parts of a 3-D mesh." This feature, when taken in the context of claim 15 and the comments provided above, is not seen or taught in the Bajaj et al patent to the understanding of the undersigned.

Claim 19 is also believed patentable insofar as it recites a 3-D mesh object layer analyzer for receiving a 3-D mesh and dividing the input 3-D mesh into one or more independent mesh object layers. This independence is not seen or taught in the applied art. Accordingly, withdrawal of this rejection is also respectfully requested.

Applicants also reiterate their arguments that the subject matter of the Bajaj et al patent is not supported in the Bajaj et al provisional application with respect to at least some of the disclosure upon which the Office appears to be

relying. Provisional Application No. 60/098150 (hereinafter referred to as "the '150 priority document") discloses on page 84 that the "format of the overall data stream is of compressed mesh" shown in Table 6 includes a header that all of the encoded mesh geometry and all of the encoded mesh conductivity data followed by encoded geometry data. Further, the geometry data's mesh are disclosed in the '150 priority document as vertices that are "encoded in strict order." See page 87, line 1. Further, each layer is encoded successively and the conductivity data following the geometry data is encoded consecutively, layer-by-layer. See page 87 at around line 17 and pages 91-92. Triangle strips are associated with the respective contours as disclosed at pages 52 and 86. Further, the Bajaj et al patent, at column 1, lines 21-49, and column 4, lines 3-5 and column 6, lines 20-23 discloses subject matter relating to "error resistant transmission reception" of the 3-D objects, "incremental" streaming modes and "packet corruption" in a "error-prone communication environment," as well as the ability to "decode and display whatever information [the receiving party] has received from the server without retransmission" are not taught or suggested in the '150 priority document. Neither is "progressive incremental transmission" taught in the '150 priority document. Instead, the '150 priority document concentrates on attempting to improve efficiency in the encoding of connectivity, geometry data and multiresolution meshes. It is not, however, concerned with solving problems addressed by the present invention or the manner in which the present invention solves those problems, including inefficiency problems related to error occurrences during transmission of mesh data and incremental transmission and reproduction of independent mesh object layers. In fact, the conclusion of the '150 priority document mentions that issues concerning the treatment of lost packets during transmission are considered fruitful grounds for future work. See pages 69 and 82, particularly page 82, lines 9-10, of the '150 priority document.

Hence, applicants respectfully submit that the relevant disclosure relied upon in the Office Action is not found in the priority document and therefore in relevant part, the Bajaj et al patent should only be given the effective prior art date of

August 26, 1999. This date is after applicants' later priority document (Korean Application 99-9528) by approximately six months. Accordingly, and in light of the submission of the accompanying certified translation of this priority application, applicants respectfully submit that the Bajaj et al patent is not prior art with respect to the portions thereof relied upon in the Office Action.

In light of the foregoing, applicants respectfully request reconsideration and withdrawal of the currently pending rejections and allowance of the application. Should any residual issues exist, the Examiner is invited to contact the undersigned at the number listed below.

Respectfully submitted,

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